COGNITION

Decision making

It is one of the most complicated forms of thinking. Cognitive psychologists are still focusing on the components and processes that underlie this type of thinking. An important area in which the cognitive psychologists are most interested. For many years psychologists have attempted to explain the processes involved for decision making, and solving problems. The most famous examples of which are

- Thorndike's trial and error problem solving.
- Kohler's insight problem solving

Mental shortcuts Algorithms and Heuristics

Algorithms: A rule, if it is applied, ensures the solution to the problem. Algorithms are always accurate. We do not necessarily understand their logical basis e.g. algebraic formula

Heuristics

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A heuristic is a rule of thumb, a strategy, or a mental shortcut that generally works for solving a problem (particularly decision-making problems). It is a practical method, one that is not a hundred per cent guaranteed to be optimal or even successful, but is sufficient for the immediate goal. The advantage of heuristics is that they often reduce the time and cognitive load required to solve a problem; the disadvantage is that they cannot always be relied on to solve the problem— just most of the time. Heuristics facilitate timely decisions. Analysts in every industry use rules of thumb such as intelligent guesswork, trial and error, process of elimination, past formulas and the analysis of historical data to solve a problem. Heuristic methods make decision making simpler and faster through short cuts and good-enough calculations. Working backwards is a useful heuristic in which you begin solving the problem by focusing on the end result.

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Algorithm

An algorithm is a series of sets of steps for solving a problem. Unlike a heuristic, you are guaranteed to get the correct solution to the problem; however, an algorithm may not necessarily be the most efficient way of solving the problem. Additionally, you need to know the algorithm (i.e., the complete set of steps), which is not usually realistic for the problems of daily life.

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The difference between an algorithm and a heuristic can be summed up in the example of trying to find a Starbucks (or some other national chain) in a city. An algorithm would be a series of steps: "Walk in an increasingly large grid pattern around the city blocks until you find a Starbucks or you have looked at every street." But a heuristic could simply be, "Well, usually they're at busy intersections; I'll just walk to the nearest busy intersection."

Other Strategies

There are many other ways of solving a problem. The most effective depends on the type of problem and the resources at hand.

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Abstraction: solving the problem in a model of the system before applying it to the real system.

Analogy: using a solution for a similar problem.

Brainstorming: suggesting a large number of solutions and developing them until the best is found.

Divide and conquer: breaking down a large, complex problem into smaller, solvable problems.

Hypothesis testing: assuming a possible explanation to the problem and trying to prove (or, in some contexts, disprove) the assumption.

Lateral thinking: approaching solutions indirectly and creatively.

Means-ends analysis: choosing an action at each step to move closer to the goal.

Morphological analysis: assessing the output and interactions of an entire system.

Proof: try to prove that the problem cannot be solved. The point where the proof fails will be the starting point for solving it.

Reduction: transforming the problem into another problem for which solutions exist.

Root-cause analysis: identifying the cause of a problem.

Trial and error: testing possible solutions until the right one is found.

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Types of heuristics

- Representative heuristics
- Availability heuristics
- Anchoring and adjustment

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